

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/GB2004/002268

International filing date (day/month/year)
28.05.2004

Priority date (day/month/year)
28.05.2003

International Patent Classification (IPC) or both national classification and IPC
F02B75/00, F01B17/02, F02D17/02

Applicant
LOTUS CARS LIMITED

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITYInternational application No.
PCT/GB2004/002268

C20 Rec'd PCT/PTO 21 OCT 2005

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/GB2004/002268

Box No. II Priority

1. ☒ The following document has not been furnished:

- ☒ copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).
- ☐ translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|-------------|--|
| Novelty (N) | Yes: Claims | 4-8,10,12,15-21,25,32-34,37-51 |
| | No: Claims | 1-3,9,11,13,14,22-24,27-31,35,36,40-44 |
| Inventive step (IS) | Yes: Claims | 6,7,12,17,18,20,32-34,37,39,45-51 |
| | No: Claims | 1-5,8-11,13-16,19,21-31,35,36,38,40-44 |
| Industrial applicability (IA) | Yes: Claims | 1-51 |
| | No: Claims | |

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/GB2004/002268

Re Item V

JC20 Rec'd PCT/PTO 21 OCT 2005

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following document:

D1: US 2001/002379 A1 (SCHECHTER MICHAEL M) 31 May 2001 (2001-05-31)

1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1-3, 9, 11, 13, 14, 22-24, 27-31, 35, 36 and 40-44 is not new in the sense of Article 33(2) PCT.

1.1 To claim 1: The document D1 discloses (the references in parentheses applying to this document) an engine that comprises, all the features of the preamble of claim 1, a reservoir for storing compressed air (56) which is connected to the variable volume chamber (over the conducts 50 and 52); and gas flow of air between the variable volume chamber and the reservoir for storing compressed air (over the conducts 50 and 52); and in that the engine has at least two additional operating modes: a second operating mode in which the inlet valve means admits charge air into the variable volume chamber, the admitted charge air is compressed by the variable volume chamber (16) reducing in volume and the gas flow control valve means allows the compressed air to flow from the variable volume chamber to the reservoir to be stored therein (paragraph 33); and a third operating mode in which the gas flow control valve means allows compressed air to flow from the reservoir into the variable volume chamber (16) and thereafter expand to force the variable volume chamber (16) to increase in volume, the expanded air subsequently being exhausted to atmosphere (paragraph 187).

As document D1 shows all the features of the first claim, the subject-matter of the first claim is not new.

1.2 To the claims 2, 3, 9, 11, 13, 14, 22-24, 27 and 28 document D2 also mentions:

- in paragraph 0192 that the expanded air can be exhausted via the exhaust valve (as claimed in claim 2),
- in paragraph 0254 that the expanded air can be exhausted via the intake valve (as claimed in claim 3),
- in paragraph 0239 and 0240 the combustion mode which uses compressed air

- from the reservoir (as claimed in claim 9),
- in paragraph 0187 the two-stroke cycle as claimed in claim 11 and the fuel delivery deactivation as claimed in the claim 13 and 14,
- in figure 2 the configuration as claimed in claim 22,
- in paragraph 0185 the hydraulic valve actuators as claimed in claim 23,
- in the paragraphs 0074 to 0078 the sensors and the controllers as claimed in claim 24,
- in paragraph 0199 the starting method of claim 27,
- at the end of paragraph 0075 the vehicle without a clutch, as claimed in claim 28.

1.3 To claim 29: The only difference between the independent claim 1 and the independent claim 1 is, that claim 1 is about an engine that comprises a variable volume chamber and that claim 29 is about an engine that comprises a plurality of variable volume chambers. Paragraph 0033 of document D1 mentions this plurality of variable volume chambers. In view thereof, the subject-matter of claim 29 is not new.

1.4 To the claims 30 and 31: They correspond to the claims 2 and 3. Because of this, the subject-matter of the claims 30 and 31 is not new.

1.5 To the claims 35 and 36: They contain basically the same features as the claims 26 and 27. Because of this, the subject-matter of the claims 35 and 36 is not new.

1.6 To claim 40-44: The independent claim 40 is about a method that is used in the engines of the claims that in this communication already have been regarded as not novel. The novelty destroying passages in document D1 are also novelty destroying for the claims 40, 42 and 44. The feature of claim 43 can be found in paragraph 0033 of document D1. Therefore, also the subject-matter of the claims 40-44 is not novel.

2 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 4, 5, 8, 10, 15, 16, 19, 21, 25, 26 and 38 does not involve an inventive step in the sense of Article 33(3) PCT.

The features of each claim are well known in the field of combustion engines. A person would use these features in order to solve the problems posed without the exercise of inventive skill.

Re Item VII

Certain defects in the international application

- 1 The features of the claims 1-51 are not provided with reference signs placed in parentheses (Rule 6:2(b) PCT).
- 2 Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the document D1 is not mentioned in the description, nor is this document identified therein.

Re Item VIII

Certain observations on the international application

Claim 29 and claim 45 have been drafted as separate independent claims. Claim 29 seems to appear to relate effectively to the same subject-matter as claim 1. Claim 45 seems to contain a part of the device, used in the device claim 1. The aforementioned claims therefore lack conciseness and as such do not meet the requirements of Article 6 PCT.

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|--|
| X | US 2001/002379 A1 (SCHECHTER MICHAEL M) 31 May 2001 (2001-05-31) | 1-5, 8-11, 13-16, 19, 21-31, 35, 36, 38, 40-44 |
| A | figures 1-16c paragraph '0002! paragraph '0013! paragraph '0028! paragraph '0030! paragraph '0033! paragraph '0074! - paragraph '0078! paragraph '0085! paragraph '0098! paragraph '0187! paragraph '0192! paragraph '0239! paragraph '0241! paragraph '0254! | 2-23, 25-28, 30-39 |
| A | ----- WO 01/46571 A (COPLAND EDWARD THOMAS LEWIS ; ALLEN JEFFREY (GB); LOTUS CAR (GB); LAW) 28 June 2001 (2001-06-28) figures 1-7 abstract claims 1-8 | 1, 24, 29, 40, 45 |
| A | ----- SCHECHTER M M: "NEW CYCLES FOR AUTOBOBILE ENGINES" SAE TECHNICAL PAPER SERIES, SOCIETY OF AUTOMOTIVE ENGINEERS, WARRENDAL, PA, US, March 1999 (1999-03), pages 1-10, XP001089612 ISSN: 0148-7191 the whole document | 1, 24, 29, 40, 45 |
| A,P | ----- FR 2 836 181 A (PEUGEOT CITROEN AUTOMOBILES SA) 22 August 2003 (2003-08-22) figures 1-4 abstract page 1, line 21 - line 22 claims 1-7 ----- -/-- | 1, 24, 29, 40, 45-51 |

INTERNATIONAL SEARCH REPORT

International Application No

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|------------------------------|
| A | US 3 958 900 A (UENO TAKAHIRO) 25 May 1976 (1976-05-25) figures 1-12 abstract claims 1,2 column 10, line 51 - line 66 column 15, line 3 - line 58 column 14, line 13 - line 36 ----- | 1,29,40, 45 |
| A | US 4 473 047 A (GUTMAN NATHAN ET AL) 25 September 1984 (1984-09-25) figure 1 abstract claims 1-12 column 4, line 24 - line 29 ----- | 1,2,9, 13,29, 30,34,45 |

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB2004/002268

| Patent document cited in search report | | Publication date | Patent family member(s) | Publication date |
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